



WATTS 2021-05

Year 91 + 05m

Monthly Newsletter of the Pretoria Amateur Radio Club
Maandelikse Nuusbrieff van die Pretoria Amateur Radio Klub

✉ PARC, PO Box 73696, Lynnwood Ridge 0040, RSA

🌐 <http://www.parc.org.za> zs6pta@zs6pta.org.za



Bulletins : 145.725 MHz : Sundays from 08h45 / Sondag vanaf 08h45

Relays: 1.840, 3.700, 7.066, 10.135, 14.235, 51.400, 438.825, 1297 MHz
and Echolink. Activated frequencies are announced prior to bulletins

Swapshop : 2m and 7.066 MHz live on-air after bulletins

Bulletin repeats on Mondays / herhalings op Maandae : 2m 19h45



Die 2021 NTT tydren het vanaf 09 - 10 April plaasgevind in die Delmas omgewing. Irene ZS6IEA en Pieter Myburgh ZS6PAM het diens verrig as veldstasies. Saam met hulle is Steven Morgan (agter) en Craig Hart (voor) wat diens verrig het as tydsbeampstes. Meer op bladsye 6-7.

The 2021 NTT rally took place from 09 - April in the Delmas vicinity. Irene ZS6IEA and Pieter Myburgh ZS6PAM provided services as field stations. With them are Steven Morgan (back) and Craig Hart (font) who acted as timing marshals. More on pages 6-7.

In This Issue / In Hierdie Uitgawe

Birthdays/Verjaarsdae ; Joys & Sorrows/Lief en Leed	p 2
PARC Bulletin Roster ; Club Fees	p 3
Fleamarket Dates 2021 / Snuffelmark Datums 2021.....	P 3
Dagboek van Gebeure / PARC Contest Participation.....	p 4
Test Cables for Antenna Verification and Adjustment.....	p 5
NTT Tydren Nuus / NTT Rally News.....	p 5-6
4X4 Rally News / 4X4 Tydren Nuus.....	p 7
Amateur Radio in Longyearbyen, Svalbard.....	p 9-13
Advertisements and HF Propagation.....	p 15

PARC Committee Meeting /
PARK Komitee Vergadering

The date of the next Meeting for the 2021 PARC Committee will be on Thursday the 20th of May 2021 at Waterlab from 17h30

Birthdays and Anniversaries / Verjaarsdae en Huweliks Herdenkings

Member's Birthdays May 2021 / Lede Verjaarsdae Mei 2021

03 Andries Schoombee ZS6SCH	24 Sybie Van der Spuy ZS6SY
06 Christopher Coetzee ZU6CC	25 Tjerk Lammers ZS6P / ZS1J (Erelid)
12 Neels Heydenrich ZS4CFH	26 Vitor Gouveia ZS6VG
14 Johan Momberg ZS6BPB	30 Dave Gough DAVEP
15 Jaco Nieuwenhuis ZS6JLN	31 David Botha ZS6O
17 Vincent Harrison ZS6BTY	31 George Ellis ZS6TA
21 Lucas Dorfling ZS6LMD	31 Gawie Basson ZS6GJJ

Spouse's May 2021 / Gades Mei 2021

No spouse's birthdays

Anniversaries May 2021 / Herdenkings Mei 2021

01 Ria and Peter Smith-Curren ZS6PJ

Member's Birthdays June 2021 / Lede Verjaarsdae Junie 2021

04 Rivac Alberts RIVAC	22 Richard Peer ZS6UK
07 Chris Oosthuyse ZS6OC	26 Pieter Stronkhorst ZR6PSR
14 Attie Reynecke ZS6REY	27 Leon Fouche ZS6LEF
19 Fanus Ferreira ZS6BUH	27 Emil Bohme ZS6EGB
21 Marc Vanoverbeke ZS6ON	30 Annelie van Niekerk ZS6AVN
22 Dylan Foord ZS6TDK	

Spouse's June 2021 / Junie 2021

01 Fiona, gade van Etienne Naude ZS6EFN
06 Sandy Woolatt ZS6ICE (Menno Havelaar ZS6AGC)
24 Belinda, gade van Johnny Scott ZS6JSS
27 Selma, gade van Joe Katzman ZS6TB

Anniversaries June 2021 / Herdenkings Junie 2021

24 Marita en Roy Alexander ZS6MI

Joys and Sorrows / Lief en Leed

Dit is met leedwese dat ons verneem het van die afsterwe van Jaco Cronje ZR6CMG. Ons innige meegevoel aan Louisa en Christopher ZU6CC.
Joey Reid, sw of Graham Reid ZS6GJR, Club Treasurer had a knee operation. We wish Joey a speedy recovery.
Gerrie Leonard ZS6GTK het 'n ernstige hartaanval gehad, en het behandeling in die hospitaal gehad. PARK wens Gerrie alle sterkte en 'n spoedige en volkome herstel toe.

PARC Membership Fees / PARK Ledegelde

For the 2020-2021 year, there will be no increases in Club Membership fees.

Club Fees therefore remain at R160 for Ordinary Members, and R60 for Pensioners and Spouse. Vir die 2020-2021 jaar sal daar geen toenames in die Klub Lidmaatskap gelde wees nie. Dus bly die gelde op R160 vir Gewone Lede, en R60 vir Pensionarisse en Gade.

PARC SUBS : PARK LEDEGELD : FROM / VANAF : 2020-10-31

Bank	First National Bank	Ordinary Members / Gewone Lede : R160 Spouses / Pensioners : R60	Your call sign must appear as statement text!
Branch Code	25 20 45		
Account No	546 000 426 73		

Please remit your subs in time to our Treasurer, or pay per transfer into the PARC account
Betaal asb. u ledegelde betyds aan ons Tesourier, of betaal per oorplasing in die PARC rekening

Please Note : If your Club fees are not paid up to date, birthday details cannot be displayed in Watts

PARC Bulletin Roster / PARK Bulletin Rooster

PARC Bulletins are presented on Sunday mornings at approximately 08h45, after the SARL Bulletins in English and Afrikaans, from 08h15. The Bulletin Presenters for the following two months are presented below. Please do contact the applicable presenter beforehand if you wish to make a contribution to the Bulletin. PARC Bulletins are broadcast on the 2-meter repeater on 145.725 MHz, and 70 cm on 438.825 and 439.025 MHz. Relays are done on 7.060 MHz by Hans Kappetijn ZS6KR and on Echolink by Johan Lehman ZS6JPL. A re-broadcast of the Bulletin is done the following Monday evening at 19h45 by Hans ZS6KR.

PARK Bulletins word op Sondagoggende aangebied om 08h45, na die SARL Bulletins in Engels en Afrikaans, vanaf 08h15. The Bulletin aanbieders vir die volgende twee maande word onder aangedui. Kontak gerus die toepaslike Bulletin leser indien u 'n bydrae tot die Bulletin wil maak. PARK Bulletins word uitgesaai op die 2-meter herhaler op 145.725 MHz, en 70cm op 438.825 en 439.025 MHz. Herleidings word gedoen op 7.060 MHz deur Hans Kappetijn ZS6KR, en op Echolink deur Johan Lehman ZS6JPL. 'n Heruitsending van die Bulletin geskied die opvolgende Maandag aand om 19h45, en word behartig deur Hans ZS6KR.

PARC Bulletin Presenters : February 2021 - June 2021			
Date	Presenter	Date	Presenter
4 April 2021	Louis de Wet ZS6SK	23 May 2021	Johan de Bruyn ZS6JHB
11 April 2021	Albert Schreuder ZS6SE	30 May 2021	Louis de Wet ZS6SK
18 April 2021	Alméro Du Pisani ZS6LDP	6 June 2021	Albert Schreuder ZS6SE
25 April 2021	Johan de Bruyn ZS6JHB	13 June 2021	Alméro Du Pisani ZS6LDP
2 May 2021	Louis de Wet ZS6SK	20 June 2021	Johan de Bruyn ZS6JHB
9 May 2021	Albert Schreuder ZS6SE	27 June 2021	Louis de Wet ZS6SK
16 May 2021	Alméro Du Pisani ZS6LDP	4 July 2021	Albert Schreuder ZS6SE

FLEA MARKET DATES / SNUFFELMARK DATUMS

PARC / PARK: 31 July ; 4 December

East Rand: 16 June ; 30 October

West Rand: 5 June ; 4 September ; 27 November

For more information contact Alméro Du Pisani: 083-938-8955

Pretoria Amateur Radio Club Meeting

At the Offices of Waterlab (Pty) Ltd

From 18h30 on 20 May 2021

23B de Havilland Crescent Persequor Park

For more information Contact Johan de Bruyn ZS6JHB at 079-333-4107

Pretoria Amateur Radio Klub Vergadering

By die Kantore van Waterlab (Edms) Bpk

Vanaf 18h30 op 20 Mei 2021

23B de Havilland Singel Persequor Park

Vir meer inligting kontak Johan de Bruyn by 079-333-4107

Diary of Contests & Events / Dagboek van Kompetisies en Gebeure

Contests and Events - May 2021 / Kompetisies en Gebeure - Mei 2021 (UTC Times)

01 - 02	10-10 International Spring Contest, CW: 00h01Z - 23h59Z
01 - 02	ARI International DX Contest: 12h00Z - 11h59Z
01 - 02	Antique Wireless Association of South Africa: Valve QSO Party
08	SARL VHF/UHF Digital Contest: 05h00Z - 07h00Z : 6m
08	SARL VHF/UHF Digital Contest: 07h00Z - 09h00Z : 2m
08	SARL VHF/UHF Digital Contest: 09h00Z - 11h00Z : 70cm
09	SARL VHF/UHF Digital Contest: 05h00Z - 07h00Z : 6m
09	SARL VHF/UHF Digital Contest: 07h00Z - 09h00Z : 2m
09	SARL VHF/UHF Digital Contest: 09h00Z - 11h00Z : 70cm
08 - 09	VOLTA WW RTTY Contest: 12h00Z - 12h00Z
15 - 16	His Majesty King of Spain Contest, CW: 12h00Z - 12h00Z
16	ZS3 Sprint
19	SARL 80m Club Sprint
21 - 23	Dayton Hamvention: https://hamvention.org/
22	Radio Amateur Examination
29 - 30	CQ World Wide WPX Contest, CW: 00h00Z - 23h59Z

Contests and Events - June 2021 / Kompetisies en Gebeure - Junie 2021 (UTC Times)

05	World Environment Day: https://www.worldenvironmentday.global/
05	SARL VHF/UHF QSO Party
05 - 06	10-10 International Open Season PSK Contest: 00h01Z - 23h59Z
08	World Ocean's Day: https://worldoceanday.org/
12	Asia-Pacific Sprint, SSB: 11h00Z - 13h00Z
12 - 13	GACW WWSA CW DX Contest: 15h00Z - 15h00Z
12 - 13	REF DDFM 6m Contest: 16h00Z - 16h00Z
16	SARL Youth Sprint
17	World QRP Day
19	SARL 40m Grid Square Sprint
19 - 20	All Asian DX Contest, CW: 00h00Z - 24h00Z
21 - 26	Top Band QSO Party
26 - 27	His Majesty King of Spain Contest, SSB: 12h00Z - 12h00Z
27	ARRL Field Day: 18h00Z - 21h00Z
30	World Asteroid Day

The Pretoria Amateur Radio Club does not accept responsibility for the accuracy of contest details listed above. For verification and more information, please visit the SARL website, www.sarl.org.za, as well as the WA7BNM international contest calendar at the following website: <http://hornucopia.com>



Pretoria Amateur Radio Klub nooi graag almal wat belangstel om aan plaaslike kompetisies deel te neem om vir Albert Schreuder ZS6SE (Komiteelid) en Gerrie Leonard ZS6GTK (Gekoopteerde Lid) te kontak om uit te vind hoe om betrokke te raak.

Pretoria Amateur Radio Club invites all who are interested to participate in local contests, to contact Albert Schreuder ZS6SE (Committee Member) and Gerrie Leonard ZS6GTK (Co-Opted Member) to obtain information on how to get involved.



Making up test cables for antenna verification and adjustment
 Elaboration and additional information of a club lecture in 2000 by Hans Kappetijn ZS6KR

If you are home brew, new (re) assembled or flea market purchase needs to go up, please read on.

Since in almost all cases measurements are done on ground or shack location with an arbitrary cable length, you may have false readings. It is exactly this cable that needs to be a true 1:1 transformation so that we can measure and adjust the unknown at the other end accurately for a true match.

The theory of choosing the correct physical cable length is simple:

The shortest electrical length where $|Z|$ repeats itself is a half-wavelength = $150 / \text{MHz}$ albeit with phase inversion. The actual physical length is shorter due to the velocity factor (Vf) which is generally 66 - 67%. Thus:

$$\lambda / 2 \approx (100 / \text{MHz}) \text{ meters}$$

So easy! - as opposed to awful "feet" in just about all American literature and hardware.

If we now look at the harmonic relationships of the classical HF bands excluding 160m and choose the favorite 7070 kHz as a target, then the following tabled values apply:

Band	Frequency (MHz)	$\lambda / 2$ (m)	These minimum lengths (or multiples thereof are illustrative for single band antenna testing. For a tri-band yagi (yellow) a cable length is necessary to satisfy all 3 bands and a nominal 14.14m is a convenient minimum length to use as it is 1λ on 20m, 1.5λ on 15m and 2λ on 10m.
10m	28.28	3.536	
15m	21.21	4.715	
20m	14.14	7.072	
40m	7.070	14.14	
80m	3.535	28.29	

Then the final touch: cut the cable a little longer by 150mm.

Short the far end Heath-Robinson style and adjust around the intended frequency for a SC indication. Then shorten the end progressively until the SC is spot on the band frequency. This is done mainly to compensate for small cable Vf differences. Then add the connector. You can follow the same calculations and procedure for any WARC band.

Similarly for a VHF and UHF test cable:

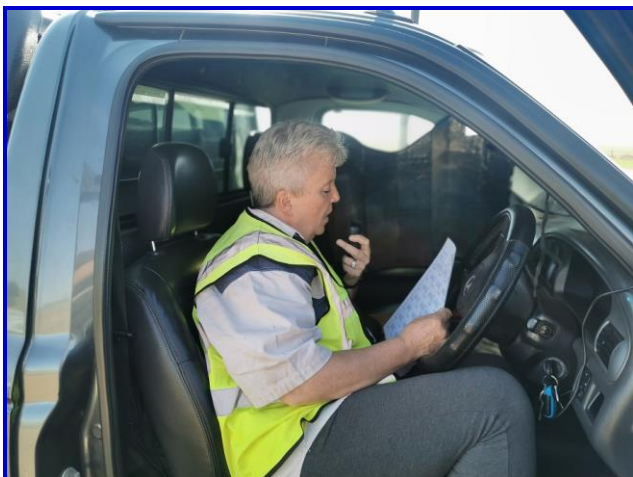
Band	Frequency (MHz)	$\lambda / 2$ (m)	$\lambda / 2$ (m)	X4 X12
VHF	145.0375	0,6895		2,756m
UHF	431.3250	0,2318		2,782m

The same trimming rules apply as in above, but with more precision.

The nominal lengths have been tabled using a median of all TX frequencies to operate all repeaters. The V/U relationship is almost 3:1. Consider the connector length also.

NTT Tydren Nuus / NTT Rally News

Die 2021 NTT tydren het op 09 - 10 April in die omgewing van Delmas plaasgevind. Die staatmaker lede van PARK het diens gelewer met die radio kommunikasie van die geleentheid. Graham Reid ZS6GJR, bygestaan deur sy gade Joey, het koördinerende van kommunikasie behartig, terwyl Menno Havelaar ZS6AGC in kar 0 diens verrig het. Veldstasies is behartig deur Johan de Bruyn ZS6JHB (Salom 1 & Weilaagte 1), Sandy Woolatt ZS6ICE (Buiteplaas 1 & Goedehoop 2), en Pieter ZS6PAM and Irene ZS6IEA Myburgh (JJ Potgieter 1 & Venter 1). Beide dae het goeie weer opgelewer en dit was werklik 'n genotvolle ervaring na die lang inperktyd. Luister gerus na die PARK bulletins op Sondag oggende vir meer inligting oor toekomstige geleenthede. Meer aksiefotos deur Louis ZS6SK op die volgende bladsy.



Irene Myburgh ZS6IEA en Johan de Bruyn ZS6JHB besig met inlees van tyd resultate



Hoe spoed-aksie en stof was aan die orde van die dag



As 'n band ingegee het, is vinnige herstelwerk langs die pad verrig



4X4 Tydren Nuus / 4X4 Rally News

Irene ZS6IEA en Pieter ZS6PAM Myburgh wat aktief betrokke is by 4x4 tydrenne het aan Watts die onderstaande brief gestuur. Tydens 'n onlangse Bestuurskomitee Vergadering van ORMU (Off-Road Marshal Unit of Southern Africa) is Irene, Willem Weideman ZS6X en Willie Greyling ZR6WGR onderskeidelik as Komiteedele aangestel. Pretoria Amateur Radio Klub wens Irene, Willem en Willie van harte geluk met hul aanstellings, en wens hulle alle voorspoed toe.



For immediate release

ELECTION OF MANAGEMENT COMMITTEE FOR 2021/22 DECISION OF ANNUAL GENERAL MEETING OF THE OFF-ROAD MARSHAL UNIT OF SOUTHERN AFRICA (ORMU) HELD ON 18 APRIL 2021 AT BASE 4 (FWDCSA) DOORNRANJIES

The following paid up members of ORMU were duly elected as members of the ORMU Committee:

Chairperson: Martin Slabbert

Treasurer: Lizette Groenewald*

Secretary: Irene Myburgh

Training Co-ordinator: Chris Barnard in conjunction with Hannes Van Rensburg.

Radio Communications and Maintenance: Willem Weideman

Other: Peter Wise (including GXCC liaison).

Willie Greyling (including unit logistics and assets)

Riaan Swanepoel (including website maintenance).

It was agreed that Hannes Van Rensburg would continue as overall ORMU liaison person for all car events (e.g., SACCS events) in his capacity as the current Chief Marshal for this event.

* Lizette Groenewald indicated that she will assist with the duties as Treasurer with the intension that the function will be handed over to Willie Greyling during the course of the current financial year.

RICHARD HOWELL

ACTING CHAIRPERSON

Date: 21-04-2021

Amateur Radio in Longyearbyen, Svalbard

Svalbard, previously known as Spitsbergen, is a Norwegian archipelago situated approximately 850km north of Europe and 1300km south of the North Pole in the Arctic Ocean, and east of Greenland (see below). In the 17th and 18th centuries, the Svalbard lands were used by whalers, and several coal mining communities were established in the early 20th century. Mining is still practiced, while other smaller activities such as research and tourism have become important supplementary industries. The University Centre in Svalbard (UNIS) is the world's northernmost higher education institution, located at Longyearbyen at 78°N. Education is provided to arctic experts in the fields of biology, geology and geophysics. The Svalbard Global Seed Vault is a critical facility providing safe storage space for countries to preserve their agricultural seeds indefinitely.



The total surface area of Svalbard (includes all islands, islets and skerries) is 61,022km², with the island of Spitsbergen consisting more than half of the surface area of Svalbard. The two other major islands are Nordaustlandet and Edgeøya. Of the total area, 36,502km² or 60% is covered by glacial ice, while 30% is barren rock, and only 10% covered by vegetation. The total human population of Svalbard is only 2,939 (2020 estimate), and when the population is taken into consideration with the surface area, the population density is 0.044/km².

Situated 74° north of the Arctic Circle, Svalbard experiences 99 days of midnight sun from 20 April to 23 August, while the polar night of 84 days lasts from 26 October to 15 February. Climatic conditions are therefore dominated by its high latitude, with average daily mean summer temperatures ranging between 4°C - 7°C, and average winter temperatures ranging between -13°C and -9°C. However, minimum record temperatures of -38.8°C to -46.3°C have been recorded from January to March.

Occasionally, on the PARC bulletin HF news, Hans Kappetijn ZS6KR reports of contacts that can be made with Radio Amateurs in Longyearbyen, which prompted this article on ham radio activities on this archipelago.

JW5E is the callsign of SARK (Svalbard Radioamatørklubb), a club for Amateur Radio operators situated in Longyearbyen, Svalbard^[1]. The club is a member of a local group connected to the national organization Norwegian Radio Relay League (NRRL). The clubhouse/radio shack (photos below) is situated on the shore of a fjord, close east to the main center of Longyearbyen and in walking distance of the main shopping street^[2].



The radio shack of SARK is equipped with a Yaesu FT-1000MP Mark V and a Kenwood TS-870, with an interlocked six-pack antenna switch at each of the operating positions^[2]. On the 26m high tower outside the radio shack on a rotator the following antennas are mounted:

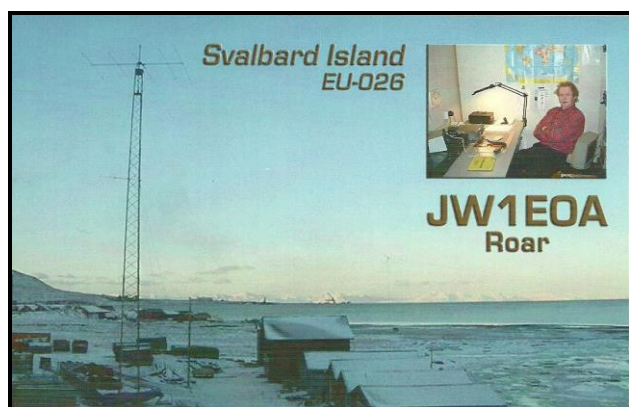
- JK rotating 40m dipole at 30m
- JK Navassa 6-10-12-15-17-20 at 28m

The following other antennas are also available:

- 6m five element beam
- Wire antennas:
 - 160m double L antenna
 - 80m inverted V dipole
 - 60m sloping dipole
 - 30m sloping dipole^[1]

A 2m repeater, JW9SRR is situated on a mountain out of town, and operates on 145.600 MHz, with a -600Hz shift and a 91.5 Hz CTCSS^[2].

A number of other local Amateur Radio stations operate from Longyearbyen and other islands on the Svalbard archipelago, as the QSL cards below show.



Regular visitors make use of the facilities of the SARK radio facility, and between 7 and 12 October 2020, JW7XK (QSL card above) has, along with JW9DL (LA9DL Just) and JW6VM (LA6VM Erling) made use of the facility to focus on satellite operation via RS-44 using SSB and CW^[3]. Photographs of the inside of the radio room of SARK, of JW7XK and his 70cm and 2m antennas are shown on the next page. The antenna of JW7XK is an Arrow antenna 10el on 70cm and 4el on 2m, mounted on a tripod with a small homemade antenna rotor. Preamps were used on both bands and a LoPass filter on 2m and a HiPass filter on 70cm.



Inside the radio shack of JW5E



JW7XK operating on VHF, UHF and satellite



2m and 70cm antennas on tripod used by JW7XK



Radio mast of the JW5E SARK club

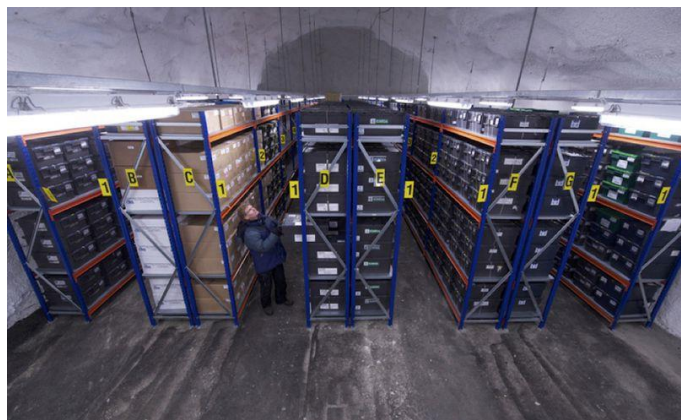


The stark beauty of Aurora borealis (northern lights) over Longyearbyen during winter

Another very interesting aspect of this archipelago is the Svalbard Global Seed Vault, a vast underground facility, situated on the island of Spitsbergen. The Norwegian Government, the Global Crop Diversity Trust, and the Consultative Group on International Agricultural Research (CGIAR) with the initiative of the conservationist Cary Fowler^[4], constructed this facility in 2008 to preserve a wide variety of plant seeds which are duplicate samples of seeds held in gene banks worldwide.



Entrance to the Svalbard Global Seed Vault



Shelving containing seed samples

The vault stores more than 800,000 samples of food crop seeds from all around the world. The collection ranges from red okra seeds from the Cherokee Indians of Tennessee, to Japanese barley seeds used in miso soup^[4]. By 2013, the seed vault stored about one-third of plant genera diversity stored in other gene banks globally. Seeds are packaged in special three-ply foil packets and heat sealed to exclude moisture. Maintained at a required temperature of -18°C , the Svalbard Global Seed Vault can preserve seeds for centuries to come.

It is illegal to die in Svalbard? This may sound a very strange question, but there is a such a myth. The question however is “if that had been the case, how would you punish the act?” Dying is not banned, it is just uncommon. The reason has a more practical implication, as no bodies are buried there anymore, as they do not decompose, due to the extremely low temperatures in the permafrost. Some of the century-old bodies in the local cemetery still contain rare remnants of the 1918 influenza virus, and still remain perfectly preserved and could still be active^[5]. Please read “*Is it illegal to die in Longyearbyen, Norway?*”^[5] and “*Svalbard, Norway: The island where no one is allowed to die, or give birth*”^[6] for more interesting information and details.



References:

^[1]JW5E. Available online from: <https://www.grz.com/db/JW5E>

^[2]Smith, D. 2015 Staying at JW5E. Available online from: <https://www.domsmith.co.uk/blog/2015/07/15/staying-at-jw5e/>

^[3]JW7XK. Available online from: <https://www.grz.com/db/IW7XK>

^[4]A “doomsday” seed vault to protect the world’s diversity. An interview with Cary Fowler. *Journal of International Affairs*. Spring/Summer 2014, Vol. 67, No 2. pp141-146.

^[5]Reilly, L. 2018. Is it illegal to die in Longyearbyen, Norway? Available online from: <https://www.mentalfloss.com/article/561935/is-it-illegal-to-die-longyearbyen-norway>

^[6]Van der Jagt, K. 2018. Svalbard, Norway: The island where no one is allowed to die, or give birth. Available online.

The do's and don'ts of proper cabling...

Now where is wire No 213981?... Thanks to Hans ZS6KR



Long Term HF Propagation for May 2021: Courtesy Vincent Harrison ZS6BTY

The graph below shows the predicted F-layer Maximum Usable Frequency (MUF) for propagation from Pretoria^[1] using monthly sunspot numbers from SILSO^[2].

Local Propagation (up to 500 km): The F or F2 critical frequency (f_oF_2) is the MUF for short range, near vertical incidence sky-wave (NVIS) propagation.

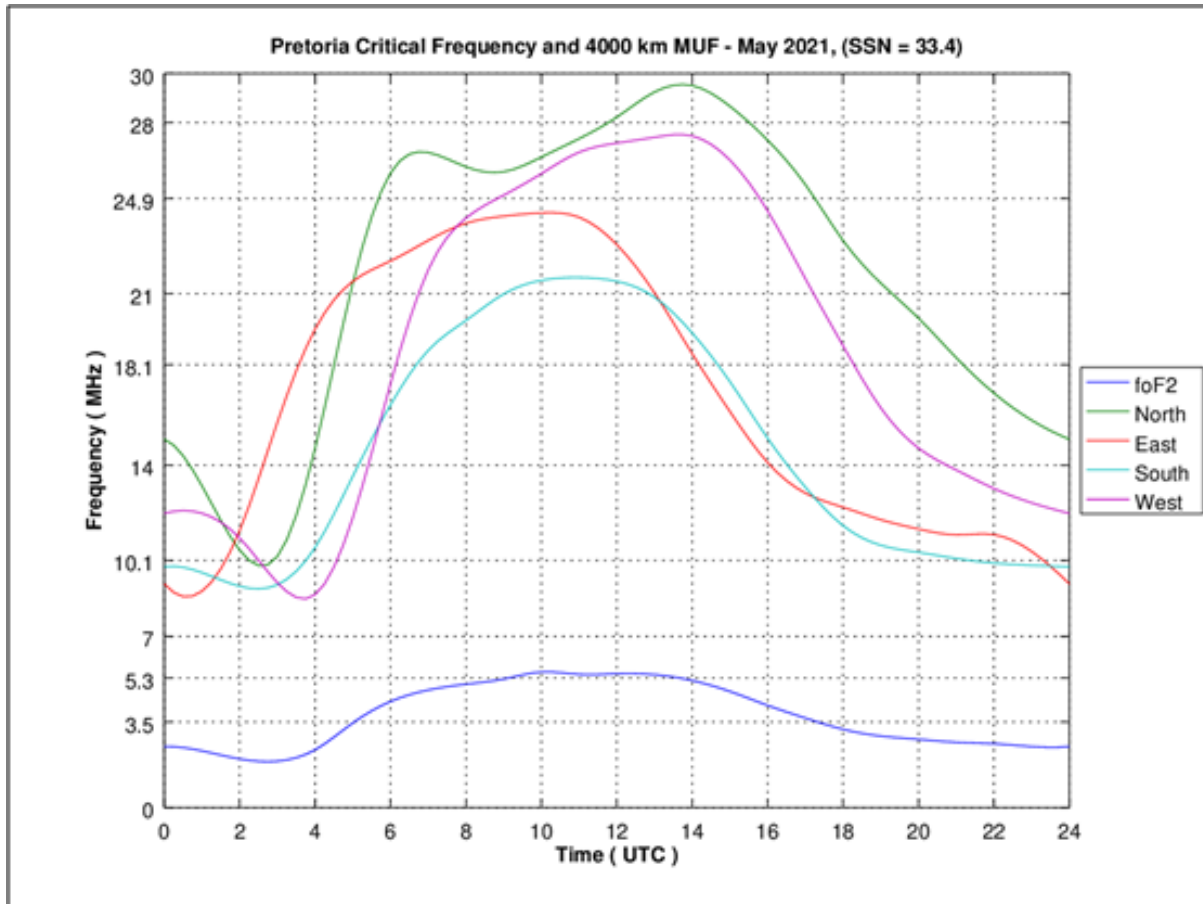
Long Distance Propagation: The MUF for a first hop of 4000 km in the cardinal directions is labeled North, East, South and West. They indicate the direction that propagation may be expected.

Worldwide Propagation Maps: <http://www.parc.org.za/index.php?page=propagation>

“Prediction is difficult, especially when dealing with the future”. . . Danish Proverb. 73 Vincent, ZS6BTY

^[1]FTZMUF2: A simple method of estimating the ionospheric parameters of f_oF_2 and $M(3000)$ with the aid of a home computer - Thomas Damboldt and Peter Süßmann, Deutsche Bundespost, December 1988.

^[2] Silso 12-month forecasts of the monthly sunspot number (<http://sidc.oma.be/silso/FORECASTS/prediML.txt>)



C/O NELSPOORT & 801 MALMESBURY STR, WINGATE PARK, PRETORIA [S25.49.36 & E28.16.07]

ICOM HAMSHACK [PTA]
Pine ZS6OB 082 4477 823
AUTHORIZED ICOM DISTRIBUTOR

FOR ALL YOUR ICOM PRODUCTS & ACCESSORIES
SPECIALLY MANUFACTURED VHF/UHF EX60B ANTENNA SYSTEMS FOR:
EME, TROPO, MS, REPEATER & SATELLITE SYSTEMS

QRV Services offers the following expertise:

- General electronic measuring and industrial equipment repairs
- Small-scale design and manufacturing
- Precise frequency and power calibration
- Technical writing
- 3rd Party scrutiny of projects and documents
- MFJ 259/69 Analyzer repairs and calibration
- Ham radio and solid state amplifier repairs
- Valuation of ham estates and their disposal.

Products:

- Legal limit 40m dipole traps
- Linear power supply O.V. protection kits
- 13,8V 45A DC switching supplies
- 30A DC Anderson Power Poles
- Connectors RF and Audio
- Plug-in triple sequential industrial timers

Contact Hans at 012-333-2612 or 072-204-3991